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INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

REC'D 06 MAY 2004



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Applicant's or agent's file reference JPG/8213 WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB 03/01272	International filing date (day/month/year) 25.03.2003	Priority date (day/month/year) 27.03.2002
International Patent Classification (IPC) or both national classification and IPC B64C3/26, B64C3/26		
Applicant AIRBUS UK LIMITED et al.		

- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 7 sheets, including this cover sheet.
 - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

- This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 13.10.2003	Date of completion of this report 04.05.2004
Name and mailing address of the International preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Calvo de No, R Telephone No. +31 70 340-3113 

**INTERNATIONAL PRELIMINARY
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International application No. PCT/GB 03/01272

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-20 as originally filed

Claims, Numbers

1-10 as originally filed
11-13 received on 09.03.2004 with letter of 09.03.2004

Drawings, Sheets

1/8-8/8 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	3,9,10,11,12
	No: Claims	1,2,4-8,13
Inventive step (IS)	Yes: Claims	9,10,11,12
	No: Claims	1-8,13
Industrial applicability (IA)	Yes: Claims	1-13
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. CITED DOCUMENTS

1.1 Reference is made to the following documents:

- D1: GB-A-1 008 671 (KIRK WING COMPANY) 3 November 1965 (1965-11-03)**
- D2: EP-A-0 078 891 (DORNIER GMBH;ECKOLD VORRICHTUNG (DE)) 18 May 1983 (1983-05-18)**
- D3: GB 195 686 A (HARRIS BOOTH;COMMERCIAL AEROPLANE WING SYND) 29 March 1923 (1923-03-29)**

2. NEGATIVE OPINIONS

2.1 The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and discloses (the references in parentheses applying to this document):

A metallic wing skin (21) comprising a first surface for forming at least a part of the external surface of an aircraft wing and a second surface opposite the first surface, wherein the second surface comprises a multiplicity of strips (23) extending in substantially the same direction (see Fig. 3).

Therefore, claim 1 appears to lack novelty under Art. 33(2) PCT.

It must be noted that, in the light of the description, the feature "strips" of the first claim can only be understood as meaning "distinct elongated portions". The longer recesses 23 in D1 can clearly be understood as such strips.

2.2 Dependent claims 2,4 and 5 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty, the reasons being as follows:

The wing skin (21) of D1 is a monolithic metal structure (see p. 2, l. 71-89). The raised segments of the grid (24) join the strips (23) in the direction to which the

strips extend, and have interface surfaces arranged to be able to receive a respective rib foot of a single rib (31) extending along the wing skin and being so arranged that the respective interface surfaces are substantially parallel to the first (outer) surface and substantially parallel to the surfaces of the rib feet that interface with the respective interface surfaces. The strips (23) are also adjacent to each other.

Therefore, neither of claims 2, 4 or 5 fulfill the requirements for novelty under Art. 33(2) PCT.

- 2.3 Dependent claim 3 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of inventive step, the reasons being as follows:
- 2.4 In claim 3 a slight constructional change in the wing skin of claim 1 is defined which comes within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen. Consequently, the subject-matter of claim 3 lacks an inventive step (Art. 33(3) PCT).
- 2.5 The document D2 is regarded as being the closest prior art to the subject-matter of claim 6, and discloses (the references in parentheses applying to this document):

An aircraft wing box including ribs (5), stringers (4) extending transversely to the ribs, and a metallic wing skin comprising a first surface (3) for forming at least a part of the external surface of an aircraft wing and a second surface opposite the first surface, wherein the second surface comprises a multiplicity of strips (6) extending in substantially the same direction and so arranged that each strip (6) is associated with a single stringer (4) (see p. 6, l. 16-p. 7, l.6 and Fig. 1).

Therefore, claim 6 does not fulfill the requirements for novelty under Art. 33(2) PCT.

- 2.6 The document D2 is also regarded as being the closest prior art to the subject-matter of method claim 7, and discloses (the references in parentheses applying to this document):

A method of manufacturing an aircraft wing structure including providing a block of metal material for machining to form a wing skin, the block having two opposing surfaces, the method including machining one of the surfaces to form the surface of the wing skin that is to be in the interior of the wing box, the machining of the surface including the steps of machining a multiplicity of strips (6) extending in substantially the same direction (see p. 6, l. 26-28).

Therefore, claim 7 does not fulfill the requirements for novelty under Art. 33(2) PCT.

- 2.7 Dependent claim 8 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of novelty, the reason being that it is implicit that, if the strips (6) are generated by milling (as disclosed in D2), the milling must at least partially follow the direction of the strip to be formed in order to generate the stringers (4).

3. POSITIVE OPINIONS

- 3.1 The subject matter of claim 9 differs from the disclosure of D2, which is considered to be the closest prior art, in that the ribs are not formed integrally with the wing skin, but instead a plurality of plateaus parallel to the outer surface is machined on the inner surface of the block and that each rib comprises a plurality of rib feet for mounting on the plateaus. The problem addressed by these features is that of reducing the weight of the wing. As this solution has not been previously proposed for solving this problem, and since it would also require significant changes to the method disclosed in D2, it would not have been obvious for the skilled person to adapt it to the manufacturing method of D2. Claim 9 therefore fulfills the novelty and inventive step criteria of Art. 33(2) & (3) PCT.
- 3.2 The subject matter of claims 10 to 13 differs from the disclosure of D2, which is considered to be the closest prior art, in that the strips have a thickness gradient in the direction in which they extend. The problem addressed by this feature is that of optimising the strength of the wing skin while reducing the weight without unduly increasing the burden of modelling and manufacturing the wing skin. This solution has not been previously proposed for solving this problem. Although D3 discloses a wing skin constructed using strips tapered in their length direction, it refers to wooden wing skins and does not address the same objective problem. It would therefore not have been obvious for the skilled person to adapt this solution to the

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wing skin and manufacturing method of D2. Claims 10 to 13 therefore fulfill the novelty and inventive step criteria of Art. 33(2) & (3) PCT.

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skin and having regard to the need for the wing skin to be able to sustain the modelled loads, and then manufacturing a metallic wing skin substantially in accordance with the design.

5 11. A metallic aircraft wing skin comprising a first surface for forming at least a part of the external surface of an aircraft wing and a second surface opposite the first surface, wherein the second surface comprises a multiplicity of strips extending in substantially the same
10 direction, the second surface being so shaped that if the wing skin were globally deformed so that the first surface were mapped onto a flat surface, there would be at least two strips that, at respective points on a notional line that is perpendicular to the direction in which the strips
15 extend, have different gradients in the direction in which the strips extend.

12. A metallic aircraft wing skin comprising a first surface for forming at least a part of the external surface of an aircraft wing and a second surface opposite the first
20 surface, wherein the second surface comprises a multiplicity of strips extending in substantially the same direction, the strips having a thickness that varies both along a notional line along the length of each strip and from one strip to the next along a notional line transverse
25 to the length of the strips.

13. A method of manufacturing an aircraft wing structure including providing a block of metal material for machining to form a wing skin according to either claim 11 or claim 12, the block having two opposing surfaces, the method
30 including machining one of the surfaces to form the second surface of the wing skin, the machining of the surface including the steps of machining a multiplicity of strips extending in substantially the same direction.